

AMENDMENTS TO THE CLAIMS

The following claim listing replaces all prior versions and listings thereof:

1-30. (Canceled)

31. (Currently amended) An occlusion clip applicator comprising:

a jaw push tube having proximal and distal push tube ends and a jaw push tube interior;
an elongate clip holder formed as a channel having first and second support rails attached thereto, the first and second support rails being substantially parallel and in alignment with each other, the clip holder having proximal and distal clip holder ends and being disposed inside the jaw push tube interior;

a clip pusher having an elongate support member with a plurality of clip push fingers attached to the elongate support member, the elongate support member being mounted such that at least a portion of each clip push finger extends into the channel interior;

a trigger; and

a pair of jaws, each jaw having:

proximal and distal jaw ends,

an inner engaging side and an opposite outer side,

a clip slot formed through the jaw from the inner engaging side to the outer side

and extending distally from and through the proximal jaw end,

a pair of parallel support shelves bounding at least a portion of the clip slot, the

support shelves each having an outer surface facing away from the inner

engaging side of the jaw;

wherein the jaws are:

pivotsly mounted at their proximal ends to the distal clip holder end; and

configured for engagement by the distal tube end for selective rotation between a fully open position and a closed position in which the engaging sides of the jaws are in contact with each other; and

wherein the trigger is operably linked to the jaw push tube and to the clip pusher such that the trigger sequentially actuates first the jaw push tube and afterward the clip pusher, so that the applicator ~~adopts~~ applies a first stage force in which the jaw push tube advances and causes the jaws to engage but the clip pusher does not move, and a second, later, stage force discontinuous to the first force, in which the clip pusher advances to urge a clip onto the support shelves of the engaged jaws.

32. (Original) An occlusion clip applicator according to claim 31 wherein the clip slot terminates in an ejection opening adjacent the distal jaw end, the clip slot having a slot width and the ejection opening having an ejection opening width that is greater than the slot width.

33. (Canceled)

34. (Original) An occlusion clip applicator according to claim 31 wherein the support rails define a gap between the support rails, the gap being sized so that a first portion of an occlusion clip is narrower than the gap and so that a second portion of the occlusion clip is wider than the gap thus allowing the clip to be slidably disposed in the clip holder with the second portion of the clip engaging the support rails.

35. (Original) An occlusion clip applicator according to claim 34 wherein the clip push fingers each terminate in a clip engagement foot configured to engage a third portion of the occlusion clip so that distal movement of the clip pusher causes the occlusion clip to slide distally along the support rails.

36. (Original) An occlusion clip applicator according to claim 31 further comprising:
means for selectively moving the jaw push tube in a distal direction to engage the jaws and cause them to rotate from the open position to the closed position; and
means for selectively moving the clip pusher in the distal direction to cause distal movement of at least one occlusion clip disposed in the clip holder.

37. (Original) An occlusion clip applicator according to claim 36 wherein the means for selectively moving the jaw push tube and the means for selectively moving the clip pusher are adapted for moving the jaw push tube and the clip pusher in a predetermined sequence initiated by a user.

38. (Original) An occlusion clip applicator according to claim 31 further comprising:
an actuator operatively associated with the jaw push tube and the clip pusher and configured to produce selective distal and proximal movement of the jaw push tube and the clip pusher relative to the clip holder.

39. (Original) An occlusion clip applicator according to claim 38 wherein the actuator is adapted to produce the distal movement of the jaw push tube and the clip pusher in a predetermined sequence initiated by a user.

40. (Original) An occlusion clip applicator according to claim 38 further comprising: a tube housing defining a tube chamber, the proximal push tube end, the proximal clip holder end and at least a portion of the actuator being disposed in the tube chamber.

41. (Original) An occlusion clip applicator according to claim 40 further comprising: a handle assembly attached to the tube housing, the handle assembly having a handgrip with a handgrip interior space and a trigger rotatably mounted to the handgrip, the trigger being operatively associated with the actuator for selective activation thereof.

42. (Currently amended) An occlusion clip applicator for storing and applying a plurality of occlusion clips each having an upper occlusion member, a lower occlusion member, and a torsion spring connecting a proximal end of the lower occlusion arm to a proximal end of the upper occlusion arm, the upper and lower occlusion members defining a main body of the clip, having a maximum main body width, and a distal portion of the clip, having a maximum distal portion width greater than the maximum main body width, the torsion spring providing a pivot axis for rotational separation of the upper occlusion member and the lower occlusion member and providing a biasing force to bias the occlusion clip toward a closed configuration, the applicator comprising:

a jaw push tube having proximal and distal push tube ends and a jaw push tube interior; an elongate clip holder configured to hold the plurality of occlusion clips, the clip holder being formed as a channel having first and second support rails attached thereto, the first and second support rails being substantially parallel and in alignment with each other and defining a gap with a gap width dimension that is greater than the main body width of the occlusion clips and less than the maximum distal portion width of the occlusion clips, the clip holder having proximal and distal clip holder ends and being disposed inside the jaw push tube interior;

a clip pusher having an elongate support member with a plurality of clip push fingers attached to the elongate support member, the elongate support member being mounted such that at least a portion of each clip push finger extends into the channel interior;

a trigger; and

a pair of jaws, each jaw having:

proximal and distal jaw ends,

an inner engaging side and an opposite outer side,

a clip slot formed through the jaw from the inner engaging side to the outer side and

extending distally from and through the proximal jaw end, and

a pair of parallel support shelves bounding at least a portion of the clip slot, the support shelves each having an outer surface facing away from the inner engaging side of the jaw;

wherein the jaws are:

pivotsly mounted at their proximal ends to the distal clip holder end; and

configured for engagement by the distal tube end for selective rotation between a fully open position and a closed position in which the engaging sides of the jaws are in contact with each other;

wherein the trigger is operably linked to the jaw push tube and to the clip pusher such that the trigger sequentially actuates first the jaw push tube and afterward the clip pusher, so that the applicator ~~adopts~~ applies a first stage force in which the jaw push tube advances and causes the jaws to engage but the clip pusher does not move, and a second, later, stage force discontinuous to the first force in which the clip pusher advances to urge a clip onto the support shelves of the engaged jaws; and

wherein the clip slot has a width dimension that is greater than the maximum main body width of the occlusion clips and less than the maximum distal portion width of the occlusion clips.

43. (Previously presented) An occlusion clip applicator according to claim 42 wherein the clip slot terminates in an ejection opening adjacent the distal jaw end, the ejection opening having an ejection opening width that is greater than the maximum distal portion width of the occlusion clips.

44. (Canceled)

45. (Original) An occlusion clip applicator according to claim 42 wherein the clip push fingers each terminate in a clip engagement foot configured to engage the distal portions of the

occlusion clips so that distal movement of the clip pusher causes the occlusion clips to slide distally along the support rails.

46. (Original) An occlusion clip applicator according to claim 42 further comprising:

means for selectively moving the jaw push tube in a distal direction to engage the jaws and cause them to rotate from the open position to the closed position; and means for selectively moving the clip pusher in the distal direction to cause distal movement of at least one occlusion clip disposed in the clip holder.

47. (Original) An occlusion clip applicator according to claim 46 wherein the means for selectively moving the jaw push tube and the means for selectively moving the clip pusher are adapted for moving the jaw push tube and the clip pusher in a predetermined sequence initiated by a user.

48. (Original) An occlusion clip applicator according to claim 42 further comprising:

an actuator operatively associated with the jaw push tube and the clip pusher and configured to produce selective distal and proximal movement of the jaw push tube and the clip pusher relative to the clip holder.

49. (Original) An occlusion clip applicator according to claim 48 wherein the actuator is adapted to produce the distal movement of the jaw push tube and the clip pusher in a predetermined sequence initiated by a user.

50. (Original) An occlusion clip applicator according to claim 48 further comprising:

a tube housing defining a tube chamber, the proximal push tube end, the proximal clip holder end and at least a portion of the actuator being disposed in the tube chamber.

51. (Original) An occlusion clip applicator according to claim 50 further comprising:

a handle assembly attached to the tube housing, the handle assembly having a handgrip with a handgrip interior space and a trigger rotatably mounted to the handgrip, the trigger being operatively associated with the actuator for selective activation thereof.

52. (Previously presented) An occlusion clip applicator according to claim 31 further comprising:

a handle assembly having a trigger and a handgrip with a handgrip interior space;

a tube housing attached to the handle assembly and defining a tube chamber in

communication with the handgrip interior space, the tube chamber and the

handgrip interior space combining to form an actuator space; and

an actuator disposed in the actuator space, the actuator configured for engagement and

selective actuation by the trigger.

53. (Original) An occlusion clip applicator according to claim 52 wherein the clip slot

terminates in an ejection opening adjacent the distal jaw end, the clip slot having a slot

width and the ejection opening having an ejection opening width that is greater than the

slot width.

54. (Canceled)

55. (Original) An occlusion clip applicator according to claim 52 wherein the support rails define a gap between the support rails, the gap being sized so that a first portion of an occlusion clip is narrower than the gap and so that a second portion of the occlusion clip is wider than the gap, thus allowing the clip to be slidably disposed in the clip holder with the second portion of the clip engaging the support rails.

56. (Original) An occlusion clip applicator according to claim 55 wherein the clip push fingers each terminate in a clip engagement foot configured to engage a third portion of the occlusion clip so that distal movement of the clip pusher causes the occlusion clip to slide distally along the support rails.

57-68 (Canceled)

69. (Previously presented) An occlusion clip applicator according to claim 34 wherein the clip push fingers each terminate in a clip engagement foot configured to engage the second portion of the occlusion clip so that distal movement of the clip pusher causes the occlusion clip to slide distally along the support rails.

70. (Previously presented) An occlusion clip applicator according to claim 55 wherein the

clip push fingers each terminate in a clip engagement foot configured to engage the second portion of the occlusion clip so that distal movement of the clip pusher causes the occlusion clip to slide distally along the support rails.

71. (Previously Presented) An occlusion clip applicator according to claim 31, wherein each jaw further has a pair of ramps bounding a proximal portion of the clip slot, the ramps having outer surfaces that are aligned with the respective support rails of the clip holder and are continuous with the outer surfaces of the respective support shelves.

72. (Previously Presented) An occlusion clip applicator according to claim 42, wherein each jaw further has a pair of ramps bounding a proximal portion of the clip slot, the ramps having outer surfaces that are aligned with the respective support rails of the clip holder and are continuous with the outer surfaces of the respective support shelves.